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R. J. Adler, J. E. Taylor

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Since the term "random field" has a variety of different connotations, ranging from agriculture to statistical mechanics, let us start by clarifying that, in this book, a random field is a stochastic process, usually taking values in a Euclidean space, and defined over a parameter space of dimensionality at least 1. Consequently, random processes defined on countable parameter spaces will not appear here. Indeed, even processes on  $\mathbb{R}$  will make only rare appearances and, from the point of view of this [...]

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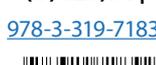
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This work reviews the most important results regarding the use of the  $\alpha$ -point in Scheduling Theory. It provides a number of different LP-relaxations for scheduling problems and seeks to explain their polyhedral consequences. It also explains the concept of the  $\alpha$ -point and how the conversion algorithm works, pointing out the relations to the sum of the weighted completion times. Lastly, the book explores the latest techniques used for many scheduling problems with different constraints, such [...]

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9 783319 775272

A. Gut

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The purpose of this book is to provide the reader with a solid background and understanding of the basic results and methods in probability theory before entering into more advanced courses (in probability and/or statistics). The presentation is fairly thorough and detailed with many solved examples. Several examples are solved with different methods in order to illustrate their different levels of sophistication, their pros, and their cons. The motivation for this style of exposition is that [...]

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9 781441 901613

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A. Gut

## Probability: A Graduate Course

Like its predecessor, this book starts from the premise that, rather than being a purely mathematical discipline, probability theory is an intimate companion of statistics. The book starts with the basic tools, and goes on to cover a number of subjects in detail, including chapters on inequalities, characteristic functions and convergence. This is followed by a thorough treatment of the three main subjects in probability theory: the law of large numbers, the central limit theorem, and the [...]

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J. Gwinner, E. P. Stephan

## Advanced Boundary Element Methods

### Treatment of Boundary Value, Transmission and Contact Problems

This book is devoted to the mathematical analysis of the numerical solution of boundary integral equations treating boundary value, transmission and contact problems arising in elasticity, acoustic and electromagnetic scattering. It serves as the mathematical foundation of the boundary element methods (BEM) both for static and dynamic problems. The book presents a systematic approach to the variational methods for boundary integral equations including the treatment with variational [...]

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S. S. Hacısalihzade

## Control Engineering and Finance

This book includes a review of mathematical tools like modelling, analysis of stochastic processes, calculus of variations and stochastic differential equations which are applied to solve financial problems like modern portfolio theory and option pricing. Every chapter presents exercises which help the reader to deepen his understanding. The target audience comprises research experts in the field of finance engineering, but the book may also be beneficial for graduate students alike.

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W. Hackbusch

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Special numerical techniques are already needed to deal with  $n \times n$  matrices for large  $n$ . Tensor data are of size  $n \times n \times \dots \times n = n^d$ , where  $n^d$  exceeds the computer memory by far. They appear for problems of high spatial dimensions. Since standard methods fail, a particular tensor calculus is needed to treat such problems. The monograph describes the methods how tensors can be practically treated and how numerical operations can be performed. Applications are problems from quantum chemistry, [...]

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K. Haderer, J. Müller

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K. P. Haderer

## Topics in Mathematical Biology

This book analyzes the impact of quiescent phases on biological models. Quiescence arises, for example, when moving individuals stop moving, hunting predators take a rest, infected individuals are isolated, or cells enter the quiescent compartment of the cell cycle. In the first chapter of Topics in Mathematical Biology general principles about coupled and quiescent systems are derived, including results on shrinking periodic orbits and stabilization of oscillations via quiescence. In [...]

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E. Hairer, G. Wanner

## Analysis by Its History

. that departed from the traditional dry-as-dust mathematics textbook. (M. Kline, from the Preface to the paperback edition of Kline 1972) Also for this reason, I have taken the trouble to make a great number of drawings. (Brieskom & Knorrer, Plane algebraic curves, p. ii) . . . I should like to bring up again for emphasis . . . points, in which my exposition differs especially from the customary presentation in the text books: 1. Illustration of abstract considerations by means of figures. 2. [...]

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E. Hairer, C. Lubich, G. Wanner

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L. J. Halbeisen

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### With a Gentle Introduction to Forcing

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M. J.D. Hamilton

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### With Applications to the Standard Model of Particle Physics

The Standard Model is the foundation of modern particle and high energy physics. This book explains the mathematical background behind the Standard Model, translating ideas from physics into a mathematical language and vice versa. The first part of the book covers the mathematical theory of Lie groups and Lie algebras, fibre bundles, connections, curvature and spinors. The second part then gives a detailed exposition of how these concepts are applied in physics, concerning topics such as the [...]

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B. Han

## Framelets and Wavelets

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J. Harris, J. L. Hirst, M. Mossinghoff

## Combinatorics and Graph Theory

There are certain rules that one must abide by in order to create a successful sequel. — Randy Meeks, from the trailer to Scream 2 While we may not follow the precise rules that Mr. Meeks had in mind for successful sequels, we have made a number of changes to the text in this second edition. In the new edition, we continue to introduce new topics with concrete examples, we provide complete proofs of almost every result, and we preserve the book's friendly style [...]

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R. Hartshorne

## Deformation Theory

In the fall semester of 1979 I gave a course on deformation theory at Berkeley. My goal was to understand completely Grothendieck's local study of the Hilbert scheme using the cohomology of the normal bundle to characterize the Zariski tangent space and the obstructions to deformations. At the same time I started writing lecture notes for the course. However, the writing project soon foundered as the subject became more intricate, and the result was no more than a projected thirteen sections, [...]

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R. Gangolli, V. S. Varadarajan

## Collected Papers V (Posthumous)

### Harmonic Analysis in Real Semisimple Groups

This volume is to be regarded as the fifth in the series of Harish-Chandra's collected papers, continuing the four volumes already published by Springer-Verlag. Because of manifold illnesses in the last ten years of his life, a large part of Harish-Chandra's work remained unpublished. The present volume deals with those unpublished manuscripts involving real groups, and includes only those pertaining to the theorems which Harish-Chandra had announced without proofs. An attempt has been made [...]

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W. E. Hart, C. D. Laird, J. Watson, D. L. Woodruff, G. A. Hackebeil, B. L. Nicholson, J. D. Sirola

## Pyomo — Optimization Modeling in Python

This book provides a complete and comprehensive guide to Pyomo (Python Optimization Modeling Objects) for beginning and advanced modelers, including students at the undergraduate and graduate levels, academic researchers, and practitioners. Using many examples to illustrate the different techniques useful for formulating models, this text beautifully elucidates the breadth of modeling capabilities that are supported by Pyomo and its handling of [...]

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M. Hermann, M. Saravi

## Nonlinear Ordinary Differential Equations

### Analytical Approximation and Numerical Methods

The book discusses the solutions to nonlinear ordinary differential equations (ODEs) using analytical and numerical approximation methods. Recently, analytical approximation methods have been largely used in solving linear and nonlinear lower-order ODEs. It also discusses using these methods to solve some strong nonlinear ODEs. There are two chapters devoted to solving nonlinear ODEs using numerical methods, as in practice high-dimensional systems of nonlinear ODEs that cannot be solved by [...]

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M. Heydenreich, R. van der Hofstad

## Progress in High-Dimensional Percolation and Random Graphs

This text presents an engaging exposition of the active field of high-dimensional percolation that will likely provide an impetus for future work. With over 90 exercises designed to enhance the reader's understanding of the material, as well as many open problems, the book is aimed at graduate students and researchers who wish to enter the world of this rich topic. The text may also be useful in advanced courses and seminars, as well as for reference and individual study. Part I, consisting of [...]

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A. M. Hinz, S. Klavžar, C. Petr

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The solitaire game “The Tower of Hanoi” was invented in the 19th century by the French number theorist Édouard Lucas. The book presents its mathematical theory and offers a survey of the historical development from predecessors up to recent research. In addition to long-standing myths, it provides a detailed overview of the essential mathematical facts with complete proofs, and also includes unpublished material, e.g., on some captivating integer sequences. The main objects of research today [...]

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M. D. Hirschhorn

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J. Hiriart-Urruty

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P. D. Hoff

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B. Hofmann, A. Leitão, J. P. Zubelli

## New Trends in Parameter Identification for Mathematical Models

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This textbook provides an introduction to numerical computing and its applications in science and engineering. The topics covered include those usually found in an introductory course, as well as those that arise in data analysis. This includes optimization and regression based methods using a singular value decomposition. The emphasis is on problem solving, and there are numerous exercises throughout the text concerning applications in engineering and science. The essential role of the [...]

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M. H. Holmes

## Introduction to the Foundations of Applied Mathematics

FOAM. This acronym has been used for over forty years at Rensselaer to designate an upper-division course entitled, Foundations of Applied Mathematics. This course was started by George Handelman in 1956, when he came to Rensselaer from the Carnegie Institute of Technology. His objective was to closely integrate mathematical and physical reasoning, and in the process enable students to obtain a qualitative understanding of the world we live in. FOAM was soon taken over by a young faculty [...]

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L. Hörmander

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This book presents, for the first time, the unpublished manuscripts of Lars Hörmander, written between 1951 and 2007. Hörmander himself organized the manuscripts and also wrote the notes explaining their origins, presenting the material in the form he fully intended it to be published in. As his daughter, Sofia Broström, mentions in the Foreword, towards the end of his life, Hörmander "carefully went through his unpublished manuscripts, checking and revising each of them with his very [...]"

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M. Hrušák, Á. Tamariz-Mascarúa, M. Tkachenko

## Pseudocompact Topological Spaces

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This book, intended for postgraduate students and researchers, presents many results of historical importance on pseudocompact spaces. In 1948, E. Hewitt introduced the concept of pseudocompactness which generalizes a property of compact subsets of the real line. A topological space is pseudocompact if the range of any real-valued, continuous function defined on the space is a bounded subset of the real line. Pseudocompact spaces constitute a natural and fundamental class of objects in [...]

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E. Hurst, M. Gould

## Bridging the Gap to University Mathematics

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T. Hytönen, J. van Neerven, M. Veraar, L. Weis

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T. Hytönen, J. van Neerven, M. Veraar, L. Weis

## Analysis in Banach Spaces

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40

A. D. Ioffe

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## The Scientific Correspondence of H.A. Lorentz

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The international conference entitled "New Trends in Approximation Theory" was held at the Fields Institute, in Toronto, from July 25 until July 29, 2016. The conference was fondly dedicated to the memory of our unique friend and colleague, André Boivin, who gave tireless service in Canada until his very last moment of his life in October 2014. The impact of his warm personality and his fine work on Complex Approximation Theory was reflected by the mathematical excellence and the wide [...]

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The book offers an in-depth study of the translation of vote counts into seat numbers in proportional representation systems – an approach guided by practical needs. It also provides plenty of empirical instances illustrating the results. It analyzes in detail the 2014 elections to the European Parliament in the 28 member states, as well as the 2009 and 2013 elections to the German Bundestag. This second edition is a complete revision and expanded version of the first edition published in [...]

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9 783319 647067

L. Qi, H. Chen, Y. Chen

## Tensor Eigenvalues and Their Applications

This book offers an introduction to applications prompted by tensor analysis, especially by the spectral tensor theory developed in recent years. It covers applications of tensor eigenvalues in multilinear systems, exponential data fitting, tensor complementarity problems, and tensor eigenvalue complementarity problems. It also addresses higher-order diffusion tensor imaging, third-order symmetric and traceless tensors in liquid crystals, piezoelectric tensors, strong ellipticity for [...]

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9 789811 080579

L. R. Rakotomanana

## Covariance and Gauge Invariance in Continuum Physics Application to Mechanics, Gravitation, and Electromagnetism

This book presents a Lagrangian approach model to formulate various fields of continuum physics, ranging from gradient continuum elasticity to relativistic gravito-electromagnetism. It extends the classical theories based on Riemann geometry to Riemann-Cartan geometry, and then describes non-homogeneous continuum and spacetime with torsion in Einstein-Cartan relativistic gravitation. It investigates two aspects of [...]

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9 783319 917818

M. Radtke, K. D. Schmidt, A. Schnaus

## Handbook on Loss Reserving

This handbook presents the basic aspects of actuarial loss reserving. Besides the traditional methods, it also includes a description of more recent ones and a discussion of certain problems occurring in actuarial practice, like inflation, scarce data, large claims, slow loss development, the use of market statistics, the need for simulation techniques and the task of calculating best estimates and ranges of future losses. In property and casualty insurance the provisions for payment [...]

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9 783319 300542

K. D. Rao

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T. M. Rassias

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9 783319 898148

K. D. Rao, M.N.S. Swamy

## Digital Signal Processing

### Theory and Practice

The book provides a comprehensive exposition of all major topics in digital signal processing (DSP). With numerous illustrative examples for easy understanding of the topics, it also includes MATLAB-based examples with codes in order to encourage the readers to become more confident of the fundamentals and to gain insights into DSP. Further, it presents real-world signal processing design problems using MATLAB and programmable DSP processors. In addition to problems that require analytical [...]

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9 789811 080807

S. Rass, S. Schauer

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### From Theory to Practice

The chapters in this volume explore how various methods from game theory can be utilized to optimize security and risk-management strategies. Emphasizing the importance of connecting theory and practice, they detail the steps involved in selecting, adapting, and analyzing game-theoretic models in security engineering and provide case studies of successful implementations in different application domains. Practitioners who are not experts in game theory and are uncertain about incorporating [...]

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T. M. Rassias

## Current Research in Nonlinear Analysis

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Current research and applications in nonlinear analysis influenced by Haim Brezis and Louis Nirenberg are presented in this book by leading mathematicians. Each contribution aims to broaden reader's understanding of theories, methods, and techniques utilized to solve significant problems. [...]

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R. Reiss, M. Thomas

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with Applications to Insurance, Finance, Hydrology and Other Fields

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L. Ribes

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This book offers a detailed introduction to graph theoretic methods in profinite groups and applications to abstract groups. It is the first to provide a comprehensive treatment of the subject. The author begins by carefully developing relevant notions in topology, profinite groups and homology, including free products of profinite groups, cohomological methods in profinite groups, and fixed points of automorphisms of free pro- $p$  groups. The final part of the book is dedicated to applications [...]

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J. Richter-Gebert

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S. I. Resnick

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Many probability books are written by mathematicians and have the built-in bias that the reader is assumed to be a mathematician coming to the material for its beauty. This textbook is geared towards beginning graduate students from a variety of disciplines whose primary focus is not necessarily mathematics for its own sake. Instead, A Probability Path is designed for those requiring a deep understanding of advanced probability for their research in statistics, applied probability, biology, [...]

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T. Richter

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F. Rindler

## Calculus of Variations

This textbook provides a comprehensive introduction to the classical and modern calculus of variations, serving as a useful reference to advanced undergraduate and graduate students as well as researchers in the field. Starting from ten motivational examples, the book begins with the most important aspects of the classical theory, including the Direct Method, the Euler-Lagrange equation, Lagrange multipliers, Noether's Theorem and some regularity theory. Based on the efficient Young measure [...]

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A. M. Robert

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Kurt Hensel (1861-1941) discovered the p-adic numbers around the turn of the century. These exotic numbers (or so they appeared at first) are now well-established in the mathematical world and used more and more by physicists as well. This book offers a self-contained presentation of basic p-adic analysis. The author is especially interested in the analytical topics in this field. Some of the features which are not treated in other introductory p-adic analysis texts are topological models of [...]

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9 780387 986692

J. Roe, R. deForest, S. Jamshidi

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S. Roman

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For the third edition, the author has added a new chapter on associative algebras that includes the well known characterizations of the finite-dimensional division algebras over the real field (a theorem of Frobenius) and over a finite field (Wedderburn's theorem); polished and refined some arguments (such as the discussion of reflexivity, the rational canonical form, best approximations and the definitions of tensor products); upgraded some proofs that were originally done only for [...]

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S. Roman

## An Introduction to the Language of Category Theory

This textbook provides an introduction to elementary category theory, with the aim of making what can be a confusing and sometimes overwhelming subject more accessible. In writing about this challenging subject, the author has brought to bear all of the experience he has gained in authoring over 30 books in university-level mathematics. The goal of this book is to present the five major ideas of category theory: categories, functors, natural transformations, universality, and adjoints in as [...]

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A. Romano, A. Marasco

## Classical Mechanics with Mathematica®

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M. Rosen

## Number Theory in Function Fields

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This volume explores the interplay between mathematical and physical research and the interactions of twentieth-century scientists within their academic communities. Beginning with Einstein's general theory of relativity, the authors investigate a series of dramatic discoveries and rival theories in physics that influenced the development of modern differential geometry. Other sections recount the numerous methods, like the resurgence of Weyl geometry, used by geometers to solve the problems [...]

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B. E. Sagan

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I have been very gratified by the response to the first edition, which has resulted in it being sold out. This put some pressure on me to come out with a second edition and now, finally, here it is. The original text has stayed much the same, the major change being in the treatment of the hook formula which is now based on the beautiful Novelli-Pak-Stoyanovskii bijection (NPS 97). I have also added a chapter on applications of the material from the first edition. This includes Stanley's [...]

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P. Saramito

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D. G. Schaeffer, J. W. Cain

## Ordinary Differential Equations: Basics and Beyond

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